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of the American Association and to receive SCIENCE. In order that the work of the association may be carried forward effectively, its membership should be increased to at least ten thousand, and it does not seem to be impossible to accomplish this when we know that the National Geographic Society has by concerted efforts increased its membership to over twenty-five thousand. It would in fact be about accomplished if each member would send one nomination to the permanent secretary. Ed.]

QUARTZ AFTER PROCHLORITE AT CRANSTON AND
WORCESTER AND COAL PLANTS AT
WORCESTER

TO THE EDITOR OF SCIENCE: During the recent field day of the New England geologists at Providence we were guided by Professor Brown to the graphite mine in the Carboniferous at Cranston. This mine interested me very greatly because of its close resemblance to the coal mine at Worcester, Mass., a resemblance which extended by chance even to the size and shape of the excavation and the dip of the rocks. There was the same greatly mashed and slickensided graphitic slate, the same white and yellow efflorescence of alumina and iron sulphates and a more abundant development of ottrelite in the adjacent schists. Our attention was especially attracted by a white to pale green mineral which filled fissures in the slate with its fine satiny fibers.

This was described as asbestos by Dr. J. W. Webster in the first volume of Silliman's Journal in 1819, and in a note the editor speaks of it as long known. It has been often mentioned since as asbestos, amianthus, or fibrolite. Its action under the microscope was so peculiar that I had it analyzed at Washington by Mr. L. G. Eakins. It proved to be a prochlorite changed in varying degrees to silica. The mean of the analyses roughly recalculated, to omit impurities, was: SiO_2 , 23.13; Al_2O_3 , 22.38; FeO , 28.76; MgO , 11.70; Alk , 1.57; H_2O , 12.45. The fibrous structure seems to be a parting developed in the chlorite by pressure as often happens in the case of muscovite.

The fact that this very peculiar metamorphosis of the carboniferous shales of the Rhode Island basin is exactly repeated at Worcester would be strong evidence that the rocks were of the same age without the coal plants which were found at the Worcester locality some years ago by Mr. J. H. Perry and determined to be *Lepidodendron acuminatum* by Lesquereux.

This note is written because doubt was expressed at the meeting as to the carboniferous age of the Worcester beds, and an old suggestion was brought up that the fossils were not authentic, that they were perhaps brought there to "salt" the mine. The slabs with fossils were dug up near the mine, one was a foot and a half long and several inches thick; and they were found by two persons at different times and were of exactly the same peculiar graphitic character as the rest of the rock at the mine and equally useless as a fuel, and there is no known locality showing exactly the same characteristics, since even at the Cranston locality the metamorphosis has been a little more severe and no fossils are found there.

The Worcester "coal mine" is the only fossiliferous locality between Providence and Bernardston on the Connecticut, and while there is no doubt that the fossils are coal plants and were found *in situ*, the common characteristics of the Worcester and Rhode Island beds are so many and so peculiar, and the succession is so similar that no doubt should arise as to their common age.

B. K. EMERSON

AMHERST, MASS.,

November 21, 1907

A SALAMANDER-SNAKE FIGHT

WHILE studying the geology of Buck Peak, twelve miles west of Riddle, Douglas Co., Oregon, last September, I saw a mortal combat that interested me very much because so anomalous. James Storrs, a mountaineer and trapper of California, well acquainted with the habits of wild animals, was with me at the time and remarked that it was "the first ring engagement he had ever seen in which the salamander showed any sand." In these

strenuous days of nature faking it is after all not surprising that even the salamanders are beginning to take an active part in affairs.

We watched the progress of the fight for a few moments each time at intervals of about forty-five minutes for three hours.

Thinking that the occurrence might be familiar to herpetologists, I sent a brief account of it to my friend Dr. C. Hart Merriam for information. In his reply he regarded the observation as important and expressed a request that the account be published in *SCIENCE* as a matter of permanent record.

The combatants were a salamander and a garter snake. The salamander was about eight inches in length, of a rather dark brown color above and lighter below. On the back and sides including the tail were irregularly elongated roundish darker spots. His smooth skin was naturally moist and being plump and chunky he seemed to be a bull-dog of his kind. Judging from the specimens kindly shown me by Dr. Stejneger in the National Museum the salamander was probably an *Amblystoma*.

The garter snake was of good size, about two feet in length, and with other stripes had reddish-brown markings on the sides. Both animals seemed to be in perfect condition for a hard fight.

When first seen in a narrow dry water course I supposed that the snake was swallowing the salamander, but the squirming of the snake attracted closer attention and the salamander was found to have a firm grip on the snake at the base of the right jaw and neck. The snake could not bite the salamander but writhed so as to turn him over and over and drag him along on his side or back without affecting the grip of the salamander. His whole attention seemed to be given to holding on without caring whether he was right side up or not.

This moderately active writhing in which the snake furnished all the energy continued for over two hours with gradually waning strength on the part of the snake. In the course of the struggle they passed beneath a bank and out of sight, but when last seen, half an hour later they were out again at the old

place. This time all was quiet. The salamander was now in control. He had changed his grip. He was directly in front of the snake and had a deep hold on its upper jaw covering its nostrils. The lower jaw of the snake was hanging limp. The salamander seemed fresh in the enjoyment of his victory, while the snake was nearly dead.

J. S. DILLER

U. S. GEOLOGICAL SURVEY,
WASHINGTON, D. C.,
December 7, 1907

TROTTING AND PACING: DOMINANT AND RECESSIVE?

In his book, *The American Trotter*, Mr. S. W. Parlin makes several allusions to the production of pacers by trotters which suggested to me the likelihood that the pacing gait may be a Mendelian recessive in the horse. In reply to my questions, Mr. Parlin, who has kindly interested himself in the matter, assures me that he has never known a natural trotter produced by two natural pacers, though, of course, pacers are often produced by trotters. Mr. John Thayer, of Lancaster, Mass., tells me that his experience agrees with that of Mr. Parlin. Certain alleged cases to the contrary have proved to be given erroneously. It seems, therefore that there is *prima facie* reason to suppose that the trotting gait depends on some physiological factor which is absent from the pacer. My object in writing this letter is to suggest to American readers the desirability of investigating the subject more fully. The materials for doing so are not to be had in England. It is scarcely necessary to point out the extraordinary interest of this illustration of Mendelian inheritance, if it should prove to be genuine. No doubt either gait may to some extent be acquired artificially by training, but I understand that the distinction between the natural trotter and the natural pacer is so definite that doubtful cases are exceptional.

W. BATESON

CAMBRIDGE, ENGLAND,
December 13, 1907.